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EXAMINER

HOANG, PHUONG N

ART UNIT PAPER NUMBER

2194

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/803,168	<b>Applicant(s)</b> KAWACHIYA ET AL.	
	<b>Examiner</b> Phuong N. Hoang	<b>Art Unit</b> 2194	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1 - 10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 - 10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

1. Claims 1 – 10 are pending for examination.
2. In view of the appeal brief filed on 12/14/2004, the examiner hereby withdraws the final rejection mailed 6/14/2004 and reopens prosecution of the subject application on the merit. The examiner regrets the delay in the citation of the newly found reference.

***Claim Rejections - 35 USC § 101***

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 3 – 5 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

- a. Claim 3 merely recites a system comprising threads sharing and accessing objects, and locking process, but fails to recite functional elements as to enable the claimed system for providing threads accessing objects, and locking process to achieve some concrete, useful, and tangible results.

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- b. Claim 4 and 5 are dependent claims of claim 5. They are rejected for the same reason above.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- c. As to claim 7, at lines 2 – 4, it is not clearly understood how the step of “canceling ..... includes .....locking process.... specific thread” would be implemented. Why the canceling step need locking process when the specific process has a locality for a specific thread. It is conflicted with claims 1 – 6.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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**8. Claims 1 – 4 and 6 – 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Houlsdword, US patent no. 6304949 in view of Holzle, US patent no. 6,209,066.**

9. Holzle reference was cited in the last office action.

10. **As to claim 1**, Houlsdword teaches a computer system having a data processing environment in which a program is divided into and executed as multiple threads, and in which the threads share and access data that is stored in a memory device, comprising:

means for indicating specific data that will be accessed only by a specific thread (a specific table for each thread which holds for a given instant all the data objects that may be accessed by the thread at that time.....that thread, col. 1 lines 65 – col. 2 lines 25 and col. 6 lines 30 – 40);

means for determining whether a specific thread indication (each stored data object may include a so-called global flag, set by the presence of a pointer..... Flag set, col. 1 lines 65 – col. 2 lines 25 and col. 6 lines 30 - 40) is present relative to the data being accessed;

Houlsdword does not explicitly teach the step of means for accessing the specific data without first performing a locking process to reject access attempts by other threads and means for performing a locking process for the data being accessed before accessing the data.

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Holzle teaches the step of:

means for accessing the specific data without first performing a locking process (threads with a private block may use a non-locking routine, col. 9 lines 10 – 20) to reject access attempts by other threads; and

means for performing a locking process for the data being accessed before (threads with shared block typically use a locking routine) accessing the data.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Houlsdword and Holzle's system because Holzle's non-locking process would get the benefits of the presence of thread specific indication, and when the thread does not have to acquire the lock, locking overhead would reduce.

11. **As to claim 2**, Houlsdworth teaches the step of wherein the specific thread detects data, included in the data stored in the memory device, and the specific thread does not have a reference pointer to the data (objects having no pointers to them in ..... delete them to thereby returning free space, col. 4 lines 50 - 55) and thereafter releases memory occupied by the data to provide storage space that is freely available.

12. **As to claim 3**, Houlsdworth teaches a data processing environment, a system in which multiple threads share and access objects, comprising the steps of:

flag data (each stored data object may include a so-called global flag..... Flag set, col. 1 lines 65 – col. 2 lines 25 and col. 6 lines 30 - 40), provided for an object, for indicating an existence of a locality specifying that the object is to be accessed only by a specific thread;

Houldsworth does not teach the step of means for having the specific thread access the object without performing a locking process to reject access attempts by other threads or other objects before accessing the specific data; and means for having the specific thread perform the locking process before accessing the object when the flag data does not indicate the locality for the specific thread.

Holzle teaches the step of:

means for having the specific thread access the object without performing a locking process to reject access attempts by other threads or other objects before accessing the specific data (threads with a private block may use a non-locking routine, col. 9 lines 10 – 20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Houldsworth and Holzle's system because Holzle's non-locking process would provide the benefits with the presence of thread specific indication, and reducing the locking overhead when the thread does not have to acquire the lock, and therefore, when there is no presence of thread specific indication, the locking is required.

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13. **As to claim 4**, Houldsworth the step of wherein, when the object is created by a thread, the object sets the flag data indicating a locality exists for the thread, and wherein, before the object is changed so that it can be accessed by another thread or another object, the locality indicated by the flag data is canceled (when the flag is off).

14. **As to claim 6**, Houldsworth teaches a memory management method for a data processing environment in which a program is divided into and executed as multiple threads, and in which the threads share and access objects that are stored in a memory device, comprising the steps of:

setting flag data indicating an existence of a locality for a specific object (each stored data object may include a so-called global flag, ..... flag set, col. 1 lines 65 – col. 2 lines 25 and col. 6 lines 30 - 40) that is to be accessed only by the specific thread;

canceled the locality indicated by the flag (flag is off when thread no longer use the object, col. 6 lines 30 - 40) data before the specific object is changed so that the specific object can be accessed by another thread.

Houldsworth does not teach the step of:

without performing a locking process to reject access attempts by other threads or objects, accessing the specific object; and locking the specific object before accessing the specific object when there is no the flag data indicating a locality for the specific thread, and the object is created by a specific thread.



Holzle teaches the step of:

without performing a locking process to reject access attempts by other threads or objects, accessing the specific object (threads with a private block may use a non-locking routine, col. 9 lines 10 – 20), locking the specific object before accessing the specific object when there is no the flag data indicating a locality for the specific thread (threads with shared block typically use a locking routine), and the object is created by a specific thread (new objects in allocated memory area to be created by threads 116 and 118, col. 2 lines 40 – 55).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Houldsworth and Holzle's system because Holzle's non-locking process would provide the benefits with the presence of thread specific indication, and reducing the locking overhead when the thread does not have to acquire the lock, and therefore, when there is no presence of thread specific indication, the locking is required.

15. **As to claim 7**, Houldsworth modified by Holzle teaches the step of wherein the step of canceling the locality indicated by the flag data for the specific object includes a step of performing the locking process (Holzle; lock, col. 9 lines 10 – 20) when the specific object has a locality for a specific thread, that was skipped at the time the specific object was accessed by the specific thread.

16. **As to claim 8**, Houlsdworth teaches a memory management method for a data processing environment in which a program is divided into and is executed as multiple threads, and in which the threads share and access objects that are stored in a memory device, comprising the steps of:

setting flag data (each stored data object may include a so-called global flag,.... Flag set, col. 1 lines 65 – col. 2 lines 25 and col. 6 lines 30 - 40) indicating an existence of a locality indicating that a specific object to be accessed only by the specific thread;

permitting the specific thread to detect an object for which flag data indicates the existence of a locality for the specific thread (data objects referred to only by the one thread, col. 1 lines 65 – col. 2 lines 25 and col. 6 lines 30 - 40), and the specific thread does not have reference pointer to the object (objects having no pointers to them, col. 4 lines 50 – 55);

releasing the detected object to provide additional storage space in the memory device that may be freely used (delete them to thereby returning free space, col. 4 lines 50 - 55).

Houldsworth does not teach the step of the object is created by a specific thread.

Holzle teaches the step of the object is created by a specific thread (new objects in allocated memory area to be created by threads 116 and 118, col. 2 lines 40 – 55).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Houldsworth and Holzle's system because Holzle's thread creating object would gain the benefits of ownership on the object and so the thread does not have to acquire the lock to reduce locking overhead.

17. **As to claim 9**, this is the medium claim of claim 6. See rejection for claim 6 above.

18. **Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Houldsworth, US patent no. 6304949.**

19. **As to claim 10**, Houldsworth teaches a computer readable code stored on computer readable medium for performing memory management for a program that executes in multiple threads, comprising:

A process for setting flag data (each stored data object may include a so-called global flag, set by the presence of a pointer..... Flag set, col. 1 lines 65 – col. 2 lines 25 and col. 6 lines 30 - 40) indicating existence of a locality indicating that a specific object that is created by a specific thread is to be accessed only by the specific thread;

A process for permitting the specific thread to detect an object for which flag data indicates the existence of a locality for the specific thread (data objects referred to only

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by the one thread, col. 1 lines 65 – col. 2 lines 25 and col. 6 lines 30 - 40) and the specific thread does not have a reference pointer to the object (objects having no pointers to them, col. 4 lines 50 – 55); and

A process for deleting the detected object so that storage space may be freely used (objects having no pointers to them in ..... delete them to thereby returning free space, col. 4 lines 50 - 55).

Houldsworth does not explicitly teach the step of releasing space by unlocking.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to recognize that the step of deleting would work as unlocking because they both return free space for further use.

### ***Allowable Subject Matter***

20. Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

21. The prior art made of record but not relied upon request is considered to be pertinent to applicant's disclosure.

Gomes, US patent no. 6,487,652, demonstrating a method for locking objects using a thread including a determination of whether a bit included in the object is set to indicate that the object is owned by a speculative owner thread.

Bacon, US patent no. 6,772,153, demonstrating a method of concurrency control over objects without atomic operations on non-shared objects.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong N. Hoang whose telephone number is (571)272-3763. The examiner can normally be reached on Monday - Friday 9:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571)272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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